TUTORIAL 1

1. Let $X = \{1, 2, 3, 4\}$ and $Y = \{2, 4, 5, 7, 8\}$.
(a) Is $3 \in X$? Is $1 \in Y$? Is $X \subseteq Y$?
(b) What is $|Y|$?
(c) Write down the set $X \cap Y$.
(d) Write down the set $X \cup Y$.
(e) Write down the set $Y - X$.

2. Let the universal set be the set **R** of all real numbers. Let $A = \{x \in \mathbf{R} \mid 0 < x < 2\}$, $B = \{x \in \mathbf{R} \mid x^2 = 9\}$and $C = \{x \in \mathbf{R} \mid 2 \leq x < 8\}$. Find each of the following:
(a) $A \cap B$
(b) $\overline{A}$
(c) $\overline{A \cup C}$
(d) Are A and B disjoint?

3. Suppose $X = \{b, c, d, e\}$. Find $\wp(X)$.

4. If a set B has 5 elements in it, what is the value of $|\wp(B)|$?

5. Let $A = \{w, x, y\}$ and $B = \{c, d\}$. Write down the following sets:
(a) A x B
(b) A x A
(c) B x A

6. Let a relation ρ on **R** mean $x > y$. Is the relation reflexive, symmetric or transitive?

7. Let $A = \{x \mid x = 2k, k \in \boldsymbol{Z}\}$ and $B = \{x \mid x = 2k + 1, k \in \boldsymbol{Z}\}$. Is $\{A, B\}$ a partition of **Z**, the set of all integers?

8. Consider the relation $\rho = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 3)\}$ on S = {1, 2, 3}.
(a) Is ρ an equivalence relation?
(b) What is the partition corresponding to the relation ρ?